

CLAIMS

What Is Claimed Is:

1. A banknote detecting unit for a banknote distinguishing device comprising:
 - a transmitting sensor unit which includes a light emitting section and a light receiving section which are located on an optical axis of the light emitting section and positioned on opposite sides to a banknote passageway,
 - a reflecting sensor unit which includes a light transmitting section and a light receiving section which are located on one side of the banknote passageway which is characterized in that: a first transmitting sensor is structured by a first optical axis of a first light emitting section which slants relative to the banknote passageway and a first light receiving section which is located on the first optical axis and is located opposite the first light emitting section,
 - a first reflecting sensor which is structured by the first light emitting section and a second light receiving section which is located on the same side as the first light emitting section relative to the banknote passageway.
2. The banknote detecting unit for the banknote distinguishing device claimed in Claim 1 wherein the first optical axis crosses at an obtuse angle relative to the banknote's traveling direction.
3. The banknote detecting unit for the banknote distinguishing device claimed in Claim 1 further includes a second light emitting section which is located opposite to the first light emitting section along the banknote passageway, the second light emitting section is located on a second optical axis.
4. The banknote detecting unit for the banknote distinguishing device claimed in Claim 3 wherein a first wavelength light is projected from the first light emitting section, and a second wavelength light is projected from the second light emitting section.
5. The banknote detecting unit for the banknote distinguishing device claimed in Claim 4 wherein the first light emitting section projects infrared light radiation, and the second light emitting section emits non-infrared light radiation.

6. The banknote detecting unit for the banknote distinguishing device claimed in Claim 4:

further includes a reading controlling unit which, when the first light emitting section emits rays, a receiving output of the first receiving section is read, and afterwards emitting from the first emitting section stops, when the second light emitting section emits rays, the receiving output of the second light receiving section is read, and afterwards the receiving output of the first light receiving section is read.

7. The banknote detecting unit for the banknote distinguishing device comprising:

a first transmitting sensor is structured by a first light emitting section which slants at a first light axis to a banknote passageway and a first light receiving section which is located on the first light axis and is located opposite the first light emitting section relative to the banknote passageway,

a first reflecting sensor which is structured by the first light emitting section and a second light receiving section which is located on the same side of the first light emitting section relative to the banknote passageway,

an emitting amount adjusting unit which adjusts an emitting amount, when the first light emitting section emits an output of the first light receiving section at a predetermined amount, and

a receiving outputting adjusting unit which adjusts a gain to the output of the second light receiving section when the output reaches a predetermined amount from the second light receiving section.

8. In a document verification system for receiving and verifying the authenticity of a document adjacent a document passageway, the improvement comprising:

a transmitting sensor assembly for emitting radiation to contact a document operatively positioned relative to the document passageway including a first radiation emitting section on one side of the document passageway and a first radiation receiving section on another side of the document passageway, the optical axis of the first radiation emitting section and first radiation receiving section is slanted relative to an axis of the document passageway; and

a reflecting sensor assembly for receiving reflected radiation from the document including a second radiation receiving section positioned on the same side

of the document passageway as the first radiation emitting section and operatively positioned to receive reflected radiation after contact with the document wherein the first radiation receiving section receives radiation transmitted through the document.

9. In a document verification system for receiving and verifying the authenticity of a document adjacent a document passageway, the improvement comprising:

- a first transmitting sensor assembly for emitting radiation to contact a document operatively positioned relative to the document passageway including a first radiation emitting section on a first side of the document passageway and a first radiation receiving section on a second side of the document passageway, a first optical axis of the first radiation emitting section and first radiation receiving section is slanted relative to an axis of the document passageway;

- a first reflecting sensor assembly for receiving reflected radiation from the document including a second radiation reflection receiving section positioned on the first side of the document passageway and operatively positioned to receive reflected radiation after contact with the document wherein the first radiation receiving section receives radiation transmitted through the document;

- a second transmitting sensor assembly for emitting radiation to contact a document operatively positioned relative to the document passageway including a second radiation emitting section on a second side of the document passageway and a second radiation receiving section on the first side of the document passageway, a second optical axis of the second radiation emitting section and second radiation receiving section is slanted relative to an axis of the document passageway and crosses the first optical axis;

- a second reflecting sensor assembly for receiving reflected radiation from the document including a third radiation reflection receiving section positioned on the second side of the document passageway and operatively positioned to receive reflected radiation after contact with the document wherein the second radiation receiving section receives radiation transmitted through the document; and

- a control unit to activate the first radiation emitting section and the second radiation emitting section in a manner to avoid interference between the emitted radiation.

10. The document verification system of Claim 9 wherein the first radiation emitting section emits light at a first wavelength and the second radiation emitting section emits light at a second wavelength different than the first wavelength.

11. The document verification system of Claim 9 wherein the control unit activates the first radiation emitting section and the second radiation emitting section multiple times during a transit of a document to provide a set of data representative of the document to be verified.

12. The document verification system of Claim 11 wherein the control unit stores a predetermined set of data representative of a valid document and compares the set of data representative of the document to be verified and issues a verification signal if the comparison is within predetermined ranges.